

FOSSIL PLANTS FROM THE ESK DISTRICT, QUEENSLAND.

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(Plates xxvi-xxviii; four Text-figures.)

[Read 26th September, 1928.]

The fossil plants described in this paper comprise two collections, one made by Messrs. J. H. Reid and C. C. Morton of the Queensland Geological Survey during their geological examination of the district, and the other by Professor H. C. Richards, Dr. W. H. Bryan and a small party of students from the University of Queensland during a geological excursion to the district. These collections supplement those previously described from the Esk Series (Walkom, 1917a, 1917b, 1924). Several species are described as new, and others are recorded for the first time from the Esk Series. The following is a list of species dealt with here:—

<i>Cladophlebis lobifolia</i> (Phillips)	<i>Neuropteridium moombaense</i> , n. sp.
<i>Cladophlebis australis</i> (Morris)	<i>Sphenopteris eskensis</i> , n. sp.
<i>Todites Williamsoni</i> (Brongn.)	<i>Sphenopteris superba</i> Shirley
<i>Thinnfeldia eskensis</i> , n. sp.	<i>Anthrophyopsis grandis</i> , n. sp.
<i>Thinnfeldia talbragarensis</i> Walkom	<i>Nilssonina eskensis</i> , n. sp.
<i>Thinnfeldia lancifolia</i> (Morris)	<i>Nilssonina Reidi</i> , n. sp.
<i>Danaeopsis Hughesi</i> Feistmantel	<i>Nilssonina Mortoni</i> , n. sp.
<i>Asterotheca Denmeadi</i> , n. sp.	? <i>Pterophyllum Nathorsti</i> (Seward)
<i>Pecopteris (Asterotheca) Hillae</i> Walkom	<i>Pseudoctenis eathiensis</i> (Richards)
<i>Taeniopteris crassinervis</i> (Feistmantel)	<i>Ginkgoites cf. magnifolia</i> Fontaine
<i>Taeniopteris Tenison-Woodsi</i> (Etheridge Jr.)	? <i>Ginkgoites sibirica</i> Heer

Of this list, *Thinnfeldia eskensis*, *Asterotheca Denmeadi*, *Neuropteridium moombaense*, *Sphenopteris eskensis*, *Anthrophyopsis grandis*, *Nilssonina eskensis*, *Nilssonina Reidi* and *Nilssonina Mortoni* are described as new, while the following additional species had not previously been described from the Esk Series:—*Todites Williamsoni*, *Thinnfeldia talbragarensis*, *Danaeopsis Hughesi*.

Todites Williamsoni occurs in rocks of Upper Triassic age in various parts of the World, but has not hitherto been recorded from Australia. *Thinnfeldia talbragarensis*, a species intermediate between *T. lancifolia* and *T. Feistmanteli*, was first described from the Jurassic rocks at Talbragar, N.S.W., and may be expected in any rocks where both the species mentioned are found; *Danaeopsis Hughesi* has been described previously from the Ipswich Series.

Of the species described as new, those which may be used for correlation with floras in other parts of the World confirm previous determinations of the age of the Esk Series as Upper Triassic (possibly Rhaetic). *Thinnfeldia eskensis* is closely allied to some specimens of *T. rhomboidalis* from the Rhaetic of Nurnberg; *Asterotheca Denmeadi* is similar to *A. Cottoni* from the Rhaetic of Tonkin; *Neuropteridium* is a genus occurring in Triassic floras of Europe and Permo-Carboniferous floras in India, South Africa and South America; and *Anthrophyopsis grandis* is similar to species occurring in the Rhaetic of Greenland and Sweden.

In a recent analysis of the flora of the Upper Karroo Beds of South Africa, Du Toit (1927) has studied carefully the ages of so-called "Rhaetic" floras, particularly where they occur in association with beds containing marine faunas. He confirms (p. 313) the correlation of the Queensland Ipswich Series with the South African Molteno Beds, and he regards the Molteno Flora as essentially of Upper Triassic (Keuper) age.

CLADOPHLEBIS LOBIFOLIA (Phillips).

Examples of this species have been described and figured (Walkom, 1924, p. 81, Pl. xv) from two localities in the Esk District. An additional specimen* (No. 1925, Q.G.S.) is here recorded from Coal Creek, 6 miles NNE. of Esk.

CLADOPHLEBIS AUSTRALIS (Morris). Plate xxvi, fig. 1.

Sterile examples of this type of frond are abundant at a locality on the road between Bellevue and Esk, and are mentioned in the description of *Todites Williamsoni* below.

TODITES WILLIAMSONI (Brongniart). Plate xxvi, figs. 1, 2.

Portions of fertile pinnae belong to this widespread Upper Triassic and Jurassic type of fern. In the specimens from the Esk Series the pinnae are long, linear, up to 1.1 cm. wide; the rachis is 1 mm. wide and the pinnules alternate, short, and obtuse, at the lower margin being convex and at the upper concave, 5 mm. long by 4 mm. wide. The sori cover practically the whole surface of the pinnule (Plate xxvi, fig. 2).

Specimens which appear indistinguishable from this species have been frequently described and figured from rocks of Upper Triassic and Jurassic ages, under a variety of specific names (for references see Seward, 1910, pp. 339-343).

The distinctions between described species of *Todites* are not very clear, and in the absence of well preserved sporangia it is hopeless to try and distinguish them. The present examples are referred to *T. Williamsoni*, since the fertile pinnae agree very closely with figured examples of that type both in the characters of the pinnules and in the distribution of the sporangia.

Further references to some of the species are to be found in papers by Gothan (1914), Johannson (1922) and Harris (1926).

The species occurs in Upper Triassic rocks in South Africa, Switzerland and Virginia and in rocks classed as Rhaetic in Tonkin, Greenland and Germany.

Closely associated with these fertile fronds are numerous sterile fronds which belong to the *Cladophlebis australis* type, and it seems more than probable that the two belonged to the same fern. In the sterile examples the pinnules are considerably larger than in the fertile.

Locality.—Road between portions 70 and 76, Parish Wivenhoe (F1728, U.Q.).

THINNFELDIA ESKENSIS, n. sp. Plate xxvii, fig. 2; xxviii, fig. 1.

Frond large, with strong, striated rachis. Pinnules large, robust, gradually tapering to rounded acute apex; upper half of lamina contracting at base, lower half broadening slightly and somewhat decurrent; midrib prominent becoming evanescent near apex; secondary veins make an acute angle (20°-25°) with midrib

* The registered numbers of the specimens in the two collections described are distinguished by the letters placed after the figures. Q.G.S. = Queensland Geological Survey; U.Q. = University of Queensland.

and divide, usually only once; a small number of veins at the base of the pinnule spring direct from the rachis.

In the largest specimen examined the frond is 24.5 cm. long and about 12 cm. broad, with the rachis 3 to 4 mm. broad; the pinnules are as much as 7 cm. long and 1.5 cm. wide.

In the specimens available the frond is simply pinnate and none shows a dichotomising rachis like the other Australian species of *Thinnfeldia*. It may be, however, that further collecting will produce more complete specimens, and this species may agree with the others in this character.

Among Australian species *T. eskensis* may be compared with *T. narrabeenensis* from the Narrabeen Beds of the Hawkesbury Series of New South Wales. In general appearance it is not so robust as the New South Wales species, the rachis not being so prominent and the pinnules being generally narrower in comparison with their length. The secondary veins also make a somewhat more acute angle with the midrib. In addition, no information is available as to the nature of the pinnules towards the base of the frond in *T. eskensis*.

The present species seems distinct from specimens described as *Danaeopsis Hughesi* from the Ipswich Series in the much smaller size of the pinnules and in the venation, the secondary veins being not so close together and making a much more acute angle with the midrib. In *D. Hughesi* the veins make an average angle of about 45° with midrib, in *T. narrabeenensis* about 30°, and in *T. eskensis*, 20°-25°. The pinnules of *T. eskensis* are not as narrow and pointed as those of *T. acuta*.

The species to which these specimens show closest resemblance is the large form of *T. rhomboidalis* described and figured by Gothan (1914) from the Rhaetic of Nurnberg, with which it may even be identical. It is interesting to find specimens of *Thinnfeldia* which appear to be practically identical, from the Northern and Southern Hemispheres. A considerable amount has been written on the genus *Thinnfeldia* (Gothan, 1912, 1914; Antevs, 1914; Walkom, 1917a), and, with the exception of the Nurnberg examples, there appeared to be a distinct difference between the European species and those of the Southern Hemisphere (Australia, South Africa and South America). The specimens from the Esk Series, therefore, may lead to a better understanding of the relation between Northern and Southern species referred to *Thinnfeldia*.

Localities.—Road between portions 70 and 76, Parish Wivenhoe (F1733, U.Q.), Moomba (1939, Q.G.S.), Schultz's Selection, Coal Creek (1929, Q.G.S.).

THINNFIELDIA TALBRAGARENSIS Walkom. Plate xxvii, fig. 1.

Mem. Geol. Survey, N.S.W.. Pal. No. 12, 1921, p. 9.

This species, intermediate between the two types *T. Feistmanteli* and *T. lancifolia*, was first described from the Jurassic rocks of Talbragar in New South Wales. A specimen closely comparable with this species has since been recorded from Mesozoic (probably Rhaetic) rocks in Tasmania (Walkom, 1925b), and now, among the plants collected in the Esk District, further examples are noted from Portion 366, Pine Mountain (No. 1932, Q.G.S.), the Moore-Benarkin Rd. (No. 1938, Q.G.S.) and the top of Wivenhoe Range, Bellevue (F1732, U.Q.).

It is not at all surprising to find this extended range for *T. talbragarensis*; indeed, in view of the probability of its close relation with the other species of *Thinnfeldia*, one would expect to find it in association with the two species above-mentioned at any locality where they are present.

THINNIFOLIA LANCIFOLIA (Morris).

This species is represented by a good example on specimen F1731 (U.Q.) from Sheep Station Creek, near Wivenhoe Crossing of Brisbane River.

DANAEOPSIS HUGHESI Feistmantel.

This species also occurs at Denmark Hill, Ipswich, in beds belonging to the Ipswich Series (see Walkom, 1917a, p. 24). It occurs among the collections from near Moombra School (No. 1916, Q.G.S.).

ASTEROTHECA DENMEADI, n. sp. Text-fig. 1.

Frond bi- (? tri-) pinnate. Pinnules (fertile) attached by whole base, almost at right angles to rachis, traversed by prominent midrib from which a number of secondary veins are given off obliquely. Apex of pinnules acuminate. Rachis striated longitudinally. Sori arranged on either side of midrib, about ten on each pinnule. Sorus composed of 3-6 (usually 4) sporangia, apparently united by proximal end to a central receptacle, free at their distal ends. Dehiscence possibly by longitudinal slit.

The pinnules are about 1.2 cm. long and 3-4 mm. wide. The nature and arrangement of the sori indicates the affinity of the specimens with species of *Asterotheca*. In having the sporangia united only in the basal region and free towards their apical end, the sorus shows closest resemblance to that of species of *Hawlea* (Stur, 1885, p. 106; Seward, 1910, p. 400, fig. 291F), which genus is considered to be congeneric with *Asterotheca* (Bower, 1908, p. 522; Seward, l.c.). In many of the individual sporangia parts of the wall may be seen to have been composed of thin walled elongated cells, and in view of the fact that this can be seen in such a large number of the sporangia and also that in no case were any thick-walled cells suggesting an annulus observed, it does not seem unreasonable to suggest that the sporangia had no distinct annulus. Further, many of the sporangia have a distinct longitudinal mark which may represent a slit along which dehiscence took place (see Text-fig. 1, c, d).

In *Dactylothea* the sporangia are not united as in *Asterotheca*.

Our species is of similar size to *A. Cottoni* from the Rhaetic of Tonkin (Zeiller, 1903, Pl. 1, figs. 4-9), but the sori are not so crowded and do not cover such a large proportion of the surface of the pinnule. The sori in *A. Cottoni* also appear to be more compact than in *A. Denmeadi*. A very close resemblance may be noted to a species of *Hawlea* figured by Stur: the general appearance of the pinnule and arrangement of sori and sporangia agree very closely with Stur's figure of *H. Milioni* (Stur, 1885, p. 108, Pl. lix, lx). This species, referred to *Pecopteris* (*Asterotheca*) *Milioni* by Seward (1910, p. 399) is a common Coal Measure form in Europe.

A. Denmeadi is a much larger species than *Pecopteris* (? *Asterotheca*) *Hillae* previously described from the Esk Series (Walkom, 1924, p. 82, Pl. 17, figs. 1-3). In *P. Hillae* very little detail of the structure of sori or sporangia was observable but there is little doubt that it was quite distinct from the species here described as new.

Locality.—Road between portions 70 and 76, Parish Wivenhoe (F1726-7, U.Q.).

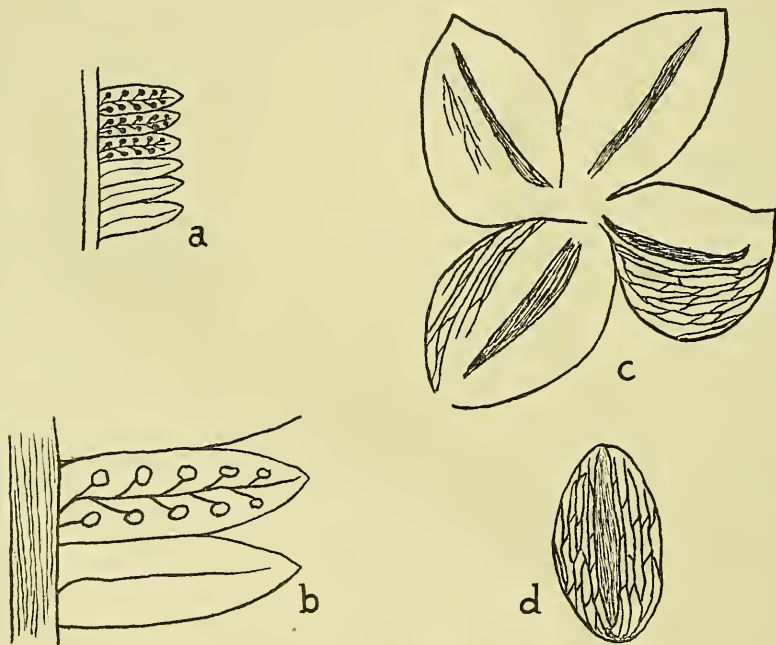
PECOPTERIS (? ASTEROTHECA) HILLAE Walkom.

This interesting species was described at some length among a series of specimens belonging to the Queensland Museum (Walkom, 1924, p. 82), and the

Geological Survey Collection contains specimens from the same locality, Portion 42, Parish of Wivenhoe.

TAENIOPTERIS CRASSINERVIS (Feismantel). Plate xxviii, fig. 6.

Specimen No. 1936 (Q.G.S.) does not agree well with examples of *T. crassinervis* previously described from Queensland, but in view of a fairly wide variation in that species, as exemplified by specimens figured from New Zealand (Arber, 1917, p. 45, Plate x), it seems wisest to refer the specimen under consideration to this species. The specimen has been a good deal broken during fossilization



Text-fig. 1.—*Asterotheca Denmeadi*, n. sp. a.—Portion of frond, nat. size. b.—Portion of frond, enlarged ($\times 3$). c.—Sorus, viewed from above ($\times 35$). d.—Sporangium ($\times 25$).

and its length is indeterminable. The width is 4.5 cm. and the base is cordate; the midrib is about 2.5 mm. wide and the veins are at right angles to the midrib and 1 to 1.5 mm. apart; they divide occasionally and sometimes the two branches join again, making a small loop in the vein; apart from this, two adjacent veins occasionally join.

There does not seem to be any good ground for separation from *T. crassinervis*. Arber described the base of the New Zealand specimens as "suddenly contracted", and little variation of this is needed to make the base cordate, if the form of the base in the Queensland specimen is natural and not due to distortion (as may possibly be the case). The specimen came from Portion 42, Parish of Wivenhoe, a locality where other examples of *T. crassinervis* have been collected.

TAENIOPTERIS TENISON-WOODSI Etheridge Jr.

Specimens referred to this species show some variation from the examples previously described. They are slightly wider, have a wider midrib and the veins are not quite so close together. There does not, however, appear to be sufficient ground at present for giving them a separate specific name.

It might be pointed out here that in my description of this species (1917a, p. 33) an error has been noted in the second line where the width is stated to be up to 8 cm.; this should read 8 mm.

Examples in the collection come from the Railway Cutting at Overbridge, Otaba (No. 1924, Q.G.S.), near Esk (1928, Q.G.S.), and from $\frac{1}{4}$ mile west of Esk Post Office.

NEUROPTERIDIUM MOOMBRAENSE, n. sp. Plate xxvii, fig. 4.

Frond pinnate; upper pinnules elongate, with lobed margin, and midrib which does not persist to apex; lower pinnules rhombic in outline, attached at one of the acute angles, veins diverging from base; pinnules contracted at base and attached by contracted portion, the lower margin being decurrent.

Specimen No. 1937 (Q.G.S.) is different from any that I have previously examined from Australian rocks, and it agrees best with *Neuropteridium*, a genus which includes Triassic European species as well as some Permo-Carboniferous plants.

In general appearance there is a considerable degree of resemblance to *N. validum* which occurs in the Lower Gondwana rocks of India and in the Permian (Permo-Carboniferous) of South America and South Africa. The pinnules are, however, notably different in shape, being much more acute at apex and more acutely contracted towards the base, a condition which results in the lower pinnules being markedly rhombic in outline and not rounded or semicircular.

The specimens are among those from the Road just south of Moomba School.

SPHENOPTERIS ESKENSIS, n. sp. Plate xxvi, fig. 3; Text-fig. 4.

A specimen with seven or eight broadly wedge-shaped leaves which, from their disposition, appear to have been attached to an axis, differs from any specimen yet found in the Australian Mesozoic rocks. It may represent a new generic type, but in the absence of sufficient information for a complete diagnosis, it is referred to the form genus *Sphenopteris* on account of the shape of the individual pinnules and their venation.

Pinnules wedge-shaped, 1.5 cm. from base to outer margin, which is slightly crenulate, traversed by a small number of radiating dichotomously branching veins.

The disposition of the pinnules, as seen in the figure, at once suggests attachment to an axis and comparison in form with such genera as *Adiantites* and *Rhacopteris* which are of common occurrence in Carboniferous rocks. Attention may be drawn in this connection to figures of *Adiantites adiantoides* L. & H. (Kidston, 1923a, Pl. xlv. fig. 3) and *Rhacopteris inaequilatera* and *R. Lindseaeformis* (Kidston, 1923b, Pl. xlix, 1), and *R. sp.* (Seward, 1910, p. 427) in all of which, however, the veins are considerably more numerous than in our specimen.

Single pinnules also resemble in general appearance some species of *Protorhipis* or *Hausmannia*, described by Nathorst, but the absence of any trace of the reticulate venation of those species separates our specimen from them.

The only figure resembling *S. eskensis* which I have been able to find among Mesozoic species is that described by Feistmantel as *Cyclopteris pachyrhachis* Gopp. from the Panchet Group of the Raniganj coalfield in India (Feistmantel,

1880, p. 84, Pl. 17a, fig. 7). The Panchet Group has been correlated with other beds as of Triasso-Rhaetic age by Arber (1905). The generic name *Cyclopteris*, however, is no longer used, it having been instituted originally for modified leaves belonging to *Neuropteris* and *Odontopteris*, and it seems likely that Feistmantel's specimen is similar to that here described from Esk.

Locality.—Railway Cutting, near Ottaba Railway Station (F1729, U.Q.).

SPHENOPTERIS SUPERBA Shirley.

Some fine examples of this species (F1730, 1731, U.Q.) have been obtained from Sheep Station Creek, near Wivenhoe Crossing of Brisbane River.

ANTHROPHYOPSIS GRANDIS, n. sp. Plate xxvi, fig. 5; Text.-fig. 2.

Frond large, apex obtuse; midrib prominent, gradually becoming finer and not persisting to apex; secondary veins first at about 45° to midrib, curving outward to 70° with midrib, forming wide elongate polygonal mesh for about one-third width of lamina, and then narrower elongate mesh.

The genus *Anthrophyopsis*, originally described by Nathorst, was later suppressed by him and all the species transferred to other genera. Recently Harris (1926) has proposed to reinstate the genus, with the two species *A. Nilssoni* and *A. crassinervis*, the former being the genotype. The structure of the cuticle of upper and lower surfaces is the more important part of Harris's description, but an attempt to isolate the cuticle of our specimens was unsuccessful. However, the venation is quite characteristic and little hesitation is felt in referring the specimens from the Esk district to this genus. The specimens give a good idea of the form of the leaf, which was previously little known.

The leaf as preserved is incomplete at the basal end, but is a handsome one, 15 cm. long and 9.5 cm. wide. The apex is very broadly obtuse, the lamina being 3.5 cm. wide at a distance of 1 cm. from the apex. The margin is somewhat irregular, being divided by indentations of varying depth. The midrib is relatively fine and distinct, some 2 mm. broad at the base of the leaf and gradually becoming thinner until it disappears about 3 mm. before reaching the apex. The secondary veins leave the midrib at an acute angle and for about one-third of the width of the lamina they form a wide elongate mesh with a general inclination of about 45° to the midrib; for the remainder of the lamina they form a narrower elongate mesh inclined at about 65° to 70° to the midrib; in the inner part the meshes are 1.2 mm. wide, wider in the basal part than the apical, while in the outer part they approximate to 7 or 8 meshes in 5 mm. of width.

In the figures of *A. crassinervis* given by Harris (1926, Pl. viii, figs. 1, 2) there is not the same difference in width of the meshes in the inner and outer parts of the leaf, though there is a distinct difference in the length of the meshes in the two zones. The same applies to Nathorst's figures of (*Ctenis*) *fallax* (1878-86, Pl. vii, fig. 3, Pl. xi, fig. 6, Pl. xix, fig. 5); the two last-mentioned figures give the impression that the meshes are shorter in the outer zone than the inner, whereas in our specimens the reverse is the case.

Nathorst's *A. obovata* (1878, Pl. 2, fig. 2) is a smaller form than ours, and the secondary venation makes a more acute angle with the midrib.

All the known species have been found in rocks of Rhaetic age, *A. Nilssoni* in the Rhaetic floras of Bjuf and Hoganas, and *A. crassinervis* in the Rhaetic of Scoresby Sound, Greenland and Bjuf.

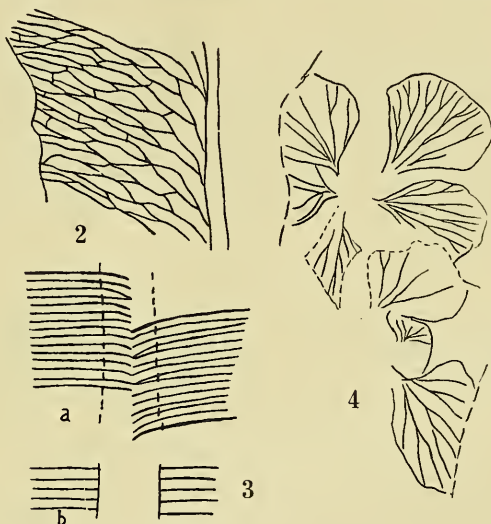
Locality.—Sheep Station Creek, near Wivenhoe crossing of Brisbane River (F1724-5, U.Q.).

NILSSONIA ESKENSIS, n. sp. Plate xxvi, fig. 4; Text-fig. 3.

An example similar in general appearance to *Pterophyllum contiguum* differs from that species in having the pinnae attached to the upper surface of the rachis, and also in the venation, the veins dividing but rarely.

The lamina is divided into distinct segments, irregular in their width, varying from 2.5 to 4.5 mm. wide, and 2.5 cm. long. The rachis is about 2 mm. wide and the veins fine, about 3 per mm., and rarely branching.

Specimen 1920 (Q.G.S.), of this species, is from Portion 85, Parish Esk.



Text-fig. 2.—*Anthrophyopsis grandis*, n. sp. Camera lucida sketch of venation. Nat. size.

Text-fig. 3.—*Nilssonias eskensis*, n. sp. Sketch showing attachment of pinnae to rachis, and the venation. *a*, from above; *b*, from below ($\times 3\frac{1}{2}$).

Text-fig. 4.—*Sphenopteris eskensis*, n. sp. Camera lucida sketch showing venation of leaves and possible arrangement of leaves about an axis, as in *Rhacopteris*. Nat. size.

NILSSONIA REIDI, n. sp. Plate xxviii, figs. 4, 5.

Frond simple; about 7 cm. wide. Lamina divided irregularly into segments from 0.4 to 1 cm. wide, attached to upper surface of rachis. The veins are straight, at right angles to apex, fine (20-25 per cm.) and rarely branching.

This species is similar in general form to *Pterophyllum multilineatum*, already recorded from the Ipswich Series, but differs in the mode of attachment of the lamina to the rachis, which, so far as known, is lateral in specimens referred to *P. multilineatum*, and also in the venation, the veins dividing comparatively frequently in the latter species. In general appearance it also suggests *N. princeps* occurring in the Jurassic of the Indian region, but is not so large and has finer venation. Comparison may also be made with some examples of *N. compta*, e.g. that figured by Seward (1900, p. 227, fig. 40), but in this case also our species is not so large and has the veins closer together.

Locality.—Chaillé's Windmill, Paddy's Gully Rd. (Nos. 1918, 1919. Q.G.S.).

NILSSONIA MORTONI, n. sp. Plate xxviii, figs. 2, 3, 7.

Frond simple, breadth 6 cm., length ? (considerably more than 10 cm.), apex broadly obtuse, gradually tapering towards base. The lamina is attached to the upper surface of the rachis, and has the margins slightly lobed; it is entire or almost so, some specimens of the basal portion showing occasional division into broad segments. Rachis 2 mm. wide, tapering towards apex, longitudinally striated. Veins fine, numerous, 30-35 per cm., rarely dividing except near their point of attachment to rachis; the veins are at right angles to the rachis, except towards the apex of the frond, where they become inclined, making an angle as low as about 60°.

These leaves are quite different from any previously described from Queensland. They have a close resemblance to some of the species recorded from Jurassic rocks in other parts of the world, particularly *N. orientalis* (Heer.) as figured by Seward (1912, Pl. iii, fig. 46) from Afghanistan. A similar type of frond from Rhaetic rocks is *N. polymorpha*. In a number of these species of *Nilssonia* it appears quite impossible to distinguish between Rhaetic and Jurassic types.

Locality.—Road just south of Moomba School, about 7 miles SE. from Esk (Nos. 1914, 1915, 1917, Q.G.S.).

? PTEROPHYLLUM NATHORSTI (Seward).

This species has been described from Portion 28, Parish Biarra (Walkom, 1917b, p. 18) and the apical portion of a frond in the collection under description is doubtfully referred to it.

Locality.—Road between portions 70 and 76, Parish Wivenhoe (F1728, U.Q.).

PSEUDOCYATHUS EATHIENSIS (Richards).

This species appears to be of fairly common occurrence in the Esk Series. *P. Footei*, from the Jurassic of India (Seward and Sahni, 1920, p. 33) is a very similar type, Feistmantel's specific name having been retained by Seward and Sahni only in view of the wide geographic separation.

Locality.—Wivenhoe (No. 1921, Q.G.S.).

GINKGOITES cf. MAGNIFOLIA Fontaine. Plate xxvii, fig. 3.

Queensland Geol. Survey, Pub. 259, p. 9, Pl. 4, f. 3, 4.

Additional large examples may be placed with that previously referred to under the above name. They are so unlike the Australian specimens which have been referred to *G. digitata* that it would seem better at present not to regard them all as conspecific. These examples are large (more than 11 cm. from base to outer margin) and have the veins about 1 mm. apart.

Locality.— $\frac{1}{4}$ -mile W. of Esk Post Office (No. 1934, Q.G.S.); Manyung Railway Station (No. 1935, Q.G.S.).

GINKGOITES (?) SIBIRICA Heer.

This species, previously recorded from Portion 24, Parish Esk (Walkom, 1924) has now been collected from Sheep Station Creek, near Wivenhoe Crossing of Brisbane River (F1731, U.Q.).

References.

- ANTEVS, E., 1914.—Die Gattungen *Thinnfeldia* Ett. und *Dicroidium* Goth. *Kunigl. Sv. Vet. Akad. Handl.*, Bd. 51, No. 6.
 ARBER, E. A. N., 1905.—The *Glossopteris* Flora. *Brit. Mus. Catalogue*.

- ARBER, E. A. N., 1917.—The earlier Mesozoic Floras of New Zealand. *N.Z. Geol. Surv., Pal. Bull.* 6.
- BOWER, F. O., 1908.—The origin of a land flora. London.
- DU TOIT, A. L., 1927.—The Fossil Flora of the Upper Karroo Beds. *Ann. S. Af. Mus.*, xxii, 289-420.
- FEISTMANTEL, O., 1880.—The Flora of the Damuda-Panchet Divisions. Fossil Flora of Gondwana System. Vol. iii, Pts. 2-3. *Mem. Geol. Surv. India*, Pal. Ind., Ser. xii.
- GOTHAN, W., 1912.—Über die Gattung *Thinnfeldia* Ettingshausen. *Abh. Nat. Ges. Nürnberg*, xix, 67-80.
- , 1914.—Die unter-liassische ("rhätische") Flora der Umgegend von Nürnberg. *Abh. Nat. Ges. Nürnberg*, xix, 89-186.
- , 1914a.—Nachtrag zur Arbeit über *Thinnfeldia* Ettingshausen. *Abh. Nat. Ges. Nürnberg*, xix, 87-88.
- HARRIS, T. M., 1926.—The Rhaetic Flora of Scoresby Sound, East Greenland. *Saertryk of Meddelelser om Gronland*, lxxviii, 43-148.
- JOHANSSON, N., 1922.—Die rätische Flora der Kohlengruben bei Stabbarp und Skromberga in Schonen. *K. Sv. Vet. Akad. Handl.*, 63, No. 5.
- KIDSTON, R., 1923a.—Fossil Plants of the Carboniferous Rocks of Great Britain. *Mem. Geol. Surv. Gt. Britain*, Pal. Vol. ii, No. 2.
- , 1923b.—Fossil Plants of the Carboniferous Rocks of Great Britain. *Mem. Geol. Surv. Gt. Britain*, Pal. Vol. ii, No. 3.
- NATHORST, A. G., 1878.—Bidrag till Sveriges fossila flora. ii. Floran vid Höganäs och Helsingborg. *K. Sv. Vet. Akad. Handl.*, Bd. 16, No. 7.
- , 1878-1886.—Om Floran i Skånes Kolförande Bildningar. *Sver. Geol. Unders.* Ser. C.
- SEWARD, A. C., 1900.—The Jurassic Flora. Part i. *Brit. Mus. Catalogue*.
- , 1910.—Fossil Plants. Vol. ii.
- , 1912.—Mesozoic Plants from Afghanistan and Afghan-Turkistan. *Mem. Geol. Surv. India*, Pal. Ind., N.S., iv, Memoir No. 4.
- SEWARD, A. C., and SAHNI, B., 1920.—Indian Gondwana Plants: A revision. *Mem. Geol. Surv. India*, Pal. Ind., N.S., vii, Memoir 1.
- STUR, D., 1885.—Die Carbon-Flora der Schatzlarer Schichten. *Abh. K.K. Geol. Reichs.*, Bd. xi, Abth. i.
- WALKOM, A. B., 1917a.—Mesozoic Floras of Queensland. Part 1 (contd.). *Q'land Geol. Survey*, Pub. 257.
- , 1917b.—Mesozoic Floras of Queensland. Part 1 (concl.). *Q'land Geol. Survey*, Pub. 259.
- , 1924.—On Fossil Plants from Bellevue, near Esk. *Mem. Q'land Mus.* viii (1), 77-92.
- , 1925b.—Notes on some Tasmanian Mesozoic Plants. Part ii. *Pap. Proc. Roy. Soc. Tas.* 1925, pp. 63-74.
- ZEILLER, R., 1903.—Flore fossile des Gîtes de Charbon du Tonkin. *Etudes Gîtes Min. France*. Paris.

EXPLANATION OF PLATES XXVI-XXVIII.

Plate xxvi.

1. *Cladophlebis australis* (Morris), sterile and *Todites Williamsoni* (Brongn.), fertile. (× 0.8). Road between portions 70 and 76, Parish Wivenhoe, Q. (Spec. F1728, U.Q.).
2. *Todites Williamsoni* (Brongn.). Portion of fertile pinna shown in Fig. 1. (× 1.6).
3. *Sphenopteris eskensis*, n. sp. (× 1.6). Railway Cutting, near Ottaba Railway Station, Q. (Spec. F1729, U.Q.).
4. *Nilssonia eskensis*, n. sp. Natural size. Portion 85, Parish Esk, Q. (Spec. 1920, Q.G.S.).
5. *Anthrophyopsis grandis*, n. sp. (× $\frac{2}{3}$). Sheep Station Creek, near Wivenhoe Crossing of Brisbane River, Q. (Spec. F1724, U.Q.).

Plate xxvii.

1. *Thinnfeldia talbragarensis* Walkom. (× $\frac{2}{3}$). Moore-Benarkin Road, Q. (Spec. 1938, Q.G.S.).
2. *Thinnfeldia eskensis*, n. sp. (× 0.7). Schultz's Selection, Coal Creek, Q. (Spec. 1929, Q.G.S.).

3. *Ginkgoites* cf. *magnifolia* Fontaine. ($\times 0.5$). Manyung Railway Station, Q. (Spec. 1935, Q.G.S.).
4. *Neuropteridium moombaense*, n. sp. ($\times 0.8$). Road at Moomba School, Q. (Spec. 1937, Q.G.S.).

Plate xxviii.

1. *Thinnfeldia eskensis*, n. sp. ($\times 0.5$). Road between Portions 70 and 76, Parish Wivenhoe, Q. (Spec. F1733, U.Q.).
 - 2, 3. *Nilssonina Mortoni*, n. sp. (2, $\times \frac{2}{3}$; 3, $\times \frac{3}{7}$). Moomba (Q.G.S. Collection).
 - 4, 5. *Nilssonina Reidi*, n. sp. ($\times 0.5$). Paddy's Gully Road, Q. (Spec. 1918, 1919, Q.G.S.).
 6. *Taeniopteris crassinervis* (Feistmantel). ($\times 0.6$). Portion 42, Parish Wivenhoe, Q. (Spec. 1936, Q.G.S.).
 7. *Nilssonina Mortoni*, n. sp. ($\times 1.5$). Portion enlarged, showing attachment of veins to upper surface of rachis. (Q.G.S. Collection).
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